Before the

Federal Communications Commission

Washington, D.C. 20554

In the Matter of	)	
	)	
Modernizing the E-rate	)	WC Docket No. 13-184
Program for Schools and Libraries	)	
	)	

INITIAL COMMENTS TO

NOTICE OF PROPOSED RULEMAKING (FCC 19-58)

SUBMITTED BY THE WEST VIRGINIA DEPARTMENT OF EDUCATION

Introduction

The West Virginia Department of Education thanks the Federal Communications Commission (FCC) for the issuance of this Notice of Proposed Rulemaking (NPRM),[1] affording all applicants the opportunity to provide data and feedback on the efficacy of the Internal Connections category of the E-rate Program. As part of our data collection, we have spoken with and collected feedback from school districts in the state, and provide this as both anecdotal and actual data in our initial comments filing.

It is with consensus that all applicants are grateful that Internal Connections funds have been more available to all rather than just the most poverty-stricken applicants, since the 2015 Modernization

[1] FCC Notice of Proposed Rulemaking FCC-19-58A1. https://docs.fcc.gov/public/attachments/FCC-19-58A1.pdf

launched the pilot budget program. It has increasingly grown participation as applicants are now aware of the promise of funding commitments, when they follow the rules and complete all processes properly.

I. Permanent Extension of Category Two Budget Approach[2]

In general, the pilot has been successful, but as with everything it also shows areas for improvement and growth. By maintaining the foundation of this pilot with some modifications, applicants will have less of a learning curve than if the FCC were to completely overhaul the pilot or return to the former Two in Five method. Resoundingly, West Virginia applicants have met this pilot with positive responses and feel that this format should continue.

Three areas of improvement that applicants focused on were the amount of funding available, flexibility of funding and simplification. The documentation process for both establishing the budget and the follow up management of equipment documentation become onerous for small districts and large alike. West Virginia believes that there are some easy modifications that can be applied that will meet all criteria.

II. Potential Improvements to the Category Two Budget Approach

Eligible Services[3]

Consistent with the Commission's determination in 2014 to make certain services eligible for category two support given the budgets' ability to prevent excessive spending, we concur with extending the eligibility of managed internal broadband services, caching, and basic maintenance of internal connections under the permanent category two budget approach. While many of West Virginia

[2] NPRM FCC-19-58A1, ¶ 14-16
[3] Ibid. ¶ 18

applications focus solely on Internal Connections and do not utilize Basic Maintenance, Caching or Managed Internal Broadband Services at a high percentage comparatively, we believe that affording the flexibility for applicants to choose is in the best interest of applicants and the program. We also believe that more of these services may have been tapped were there enough funding in the budgets.

When asked if there are additional services that the FCC should make eligible for category two funding or any other issues regarding category two eligible services we should consider, West Virginia applicants resoundingly had a list of items that they were most concerned about:

- ***Collapsing the Category 2 Categories.*** Applicants have been long frustrated by the delineation of Internal Connections and Basic Maintenance of Internal Connections (BMIC) when it comes to eligibility of licensing that is bundled with BMIC services. Most are unaware when they competitively bid which products require licensing and/or what components the licensing includes. While applicants were made aware of the requirements of the Eligible Services List, bidding for Basic Maintenance is misleading to the service providers when representing what the applicants actually seek when requesting bids.

  > **Para 7.** We note, however, that software upgrades and patches, including bug fixes and security patches, are considered basic maintenance of internal connections, and as such, applicants should seek bids for basic maintenance of internal connections if they intend to request funding for these services.[4]

  We propose that the FCC merge the Category 2 Categories of Eligible Broadband Internal Connections, Eligible Managed Internal Broadband Services and Basic Maintenance of Eligible

[4] FY2019 ESL, Appendix B at 4. https://docs.fcc.gov/public/attachments/DA-18-1173A1.pdf

Broadband Internal Connections into one similar to the way the FCC merged Telecommunications and Internet Access in 2010 with the FCC Sixth Report and Order.[5] Service Providers will still receive all the requests, but now if an applicant requests a switch and that switch includes licensing that includes some form of basic maintenance, nothing will be denied or require cost-allocation because the wrong category was selected. A service provider interested in providing Basic Maintenance services won't be mislead into thinking that is the goal of the district when a category is selected that isn't the goal of the applicant, but merely a stopgap to ensure that the entire licensing cost will be covered by E-rate funding.

The FCC will still be able to identify at the time of Form 471 which product type funding is being committed to, but applicants won't be unnecessarily penalized.

- ***Allowing eligible equipment to be used for any purpose.*** Until the 2015 Modernization Order, applicants were able to request equipment and cabling services that supported VoIP phones and security cameras. This shift has been frustrating for applicants and making the program more onerous as they now must determine the port counts that are serving these components. We ask that, in the same way that a security guard was eligible to have a cell phone funded by E-rate, that the use of drops and switches to support security cameras be allowable. This is further supported by FCC program rules that state:

> We reiterate our recognition that the technology needs of participants in the schools and libraries program are complex and unique to each participant. We find that, in the

[5] FCC Sixth Report and Order, See Appendix A, 47 C.F.R. § 54.502(a)(2) as amended herein.https://docs.fcc.gov/public/attachments/FCC-10-175A1.pdf

> case of schools, activities that are integral, immediate, and proximate to the education of students, or in the case of libraries, integral, immediate, and proximate to the provision of library services to library patrons, qualify as educational purposes under this program. To guide applicants in preparing their applications and to streamline the Administrator's review of applications, *we further establish a presumption that activities that occur in a library or classroom or on library or school property are integral, immediate, and proximate to the education of students or the provision of library services to library patrons.*[6]

Currently, federal programs like Title IV-A require supporting safe and health students.[7] Security cameras allow staff in the school, as well as first-responders, to monitor security and ensure students feel safe. We are not proposing that the FCC make end-user security cameras eligible, but instead ask that the clarification be made that the drops and switch ports, and other associated equipment, that support them do not require cost-allocation. Additionally, what was once utilized in an eligible function may not always serve that role. If an audit is performed years later, a drop that was initially for a computer, may be in use with some other type of device since hardwired equipment could potentially be phased out.

- In the same vein, as applicants are struggling to replace the monthly recurring services for voice, permitting the utilization of cabling drops and switch ports. The bottom line is this: Applicants are limited to their E-rate funding by the per-pupil budgets. Shouldn't they have the option to

[6] Schools and Libraries Universal Service Support Mechanism, Second Report and Order and Further Notice of Proposed Rulemaking, CC Docket No. 02-6, 18 FCC Rcd 9202, 9208, ¶ 17 (emphasis added).
[7] Title IV-21st Century Schools, pp. 215-216, 220, 227.
https://safesupportivelearning.ed.gov/sites/default/files/ESSA%2C%20Title%20IV%2C%20Part%20A%20Statute.pdf

determine how they need to implement their projects? A drop should be a drop, and a port should be a port—no matter the purpose of the support. Currently, drops to support peripherals, such as printers, are eligible. This should be clarified as both part of the Eligible Services List NPRM, as well as in this proceeding to permit simplification and flexibility to all applicants with their limited funding. We are not proposing that the FCC make phone handsets eligible, but instead ask that the clarification be made that, at a minimum, drops and switch ports, and other associated equipment, that support them do not require cost-allocation and would like to see network electronics (VoIP hardware) moved into the eligible services list for Funding Year 2020.

- ***Re-introducing VoIP Equipment to Eligibility.*** The re-introduction of Voice over Internet Protocol (VoIP) electronics—with the phase-out of voice services, school districts were left without support for phone services and unable to afford to purchase the electronics required to launch VoIP as a more cost-effective model while still paying the monthly recurring bills to support seamless phone services for safety and security of students during the educational process. This won't harm the fund as schools are already limited by their per-pupil budget.

- ***Permitting all entities within a district to utilize E-rate funds, including non-instructional facilities.*** Since implementation of the Modernization Order, starting in funding year, 2015, classrooms located within non-instructional facilities (NIFs) were unable to attain support. The utilization of equipment at the NIF facilities is no different than school-level administration staff utilizing Wi-Fi in a school location. Since the budgets are per pupil, no funds are going to be above and beyond what the district would require—it just permits flexibility in utilization.

Furthermore, centralized data centers in NIFs have been penalized, despite offering a more cost-effective means by which schools could realize a reduction in actual costs. Since a centralized controller can reduce costs to schools for Wi-Fi networks exponentially, we believe that allowing districts to house equipment in currently ineligible locations could actually save the fund and schools precious dollars. Whereas, currently a school district would be motivated to install one controller per school, now the district could reduce costs by installing one larger controller in the district and share licensing among all school locations without arduous cost-allocation. Additionally, the current rules require cost-allocation of the utilization of centralized equipment by ineligible NIFs. In this proposal, since the budgets are district-wide, applicants can determine where their needs lie and avoid cost-allocation of ancillary utilization of equipment which generally doesn't increase the cost of the equipment.

- ***Additional items for eligibility and Clarification on Category of Services.*** We also find that filtering hardware and services should be added to the eligible services list but clarify that this should not be included in Category 2. These should be limited to Category 1. We will also be filing Eligible Services List (ESL) comments to add that we propose that Distributed Denial-of-Service attack (DDoS) software and services be included in Category 1 eligibility and do not feel that Category 2 is the appropriate venue for these services.

Budget Levels[8]

Despite the Bureau's finding in the Category Two Budget Report[9] that the category two budget approach appears to be sufficient for most schools and libraries, West Virginia has **not** found this to

[8] NPRM FCC-19-58A1, ¶ 19-21

[9] *Category Two Budget Report*, para. 43. https://docs.fcc.gov/public/attachments/DA-19-71A1_Rcd.pdf

be the case. We have data that effectively identifies that levels of funding required for a variety of sized schools. None of which is even close to the $150 per student, even with inflation factors applied. While the Report found that approximately half of schools and most libraries used less than half of their allocated five-year budget and a supermajority of schools and libraries used less than 90% of their budgets, please note that several factors may impact this in other states in the way they have in West Virginia.

- In Funding Years 2015 and 2016, applicants were still wary of the amount of work involved in E-rate with the risk of no funding commitment like they had faced in prior funding years.

- Many applicants had given up hope on the promise of Internal Connections funding and pursued upgrades without E-rate—those implementations were still in play during the period of time considered in the report.

- Floor schools' $9,200.00 allocation (average 80% discount would net only $7,360.00) was not congruent with the amount of work and documentation required of applicants to justify the total cost of ownership, including the time applicants spend on the funding and/or documentation process, including those that had consulting fees. Those applicants ended up netting between $6,600.00 and $6,800.00 in actual funding after discount calculations and consulting fees were applied.

- Due to the limitations of the budgets, applicants found the process both cumbersome and onerous. The lack of ability to move equipment until a school closes or after 3 years has also

been of concern. If enrollment drops and increases in another location, applicants currently can't move equipment to the new location with that trend due to the strict Equipment Transfer Rules.[10]

- The Form 471 doesn't allow applicants to show line items that go above and beyond their budget by zeroing out a line item, thus anything above and beyond the budget are not visible to the FCC and thus the total project scope and costs are not a data point available from the Form 471 process.

District-Wide or Library System-Wide Budget Calculations[11]

When the West Virginia Department of Education sought feedback on district-wide budgets, it was resounding that applicants sought flexibility, and this was an ideal means by which to do so. This will also streamline and eliminate the onerous task of having to cost-allocate applications down to the individual school budget. While on the surface, one would assume this process would simply total the enrollment of all schools and determine a budget at the district level, similar to the way that the district discount is calculated, we found that smaller floor schools will be negatively impacted in this methodology and thus recommend that the calculations occur on the school level, but the budget amount is applied district-wide with flexibility to ensure that enough funds for floor schools are available. This ensures that all locations have a sufficient amount of funds. This will also reduce the load for PIA in reviewing and having to review each school's budget to reduce, which should expedite the application review process and ultimate funding commitment release. Since West Virginia has yet to

[10] CFR 47 § 54.513 (d). Resale and transfer of services. https://www.ecfr.gov/cgi-bin/text-idx?SID=14f1120049c78b28959e85d95fe6c7c5&mc=true&node=se47.3.54_1513&rgn=div8

[11] NPRM FCC-19-58A1, ¶ 22-27

name a charter school, we remain silent on this topic as we do not have experience or evidence in regard to this issue.

We also believe that very little immediate retrofitting of the E-rate Portal (EPC) system would be required in this process. Since the EPC system doesn't limit an applicant when filing the Form 471 by a particular budget amount and the budget requirements are met during Program Integrity Assurance (PIA) review, the applicants could start in Funding Year 2020 by simply showing all entities in the district as recipient of service, or select the recipients of service to identify where equipment will go, but then select budgets to be shared equally.

Budget Calculations[12]

While looking at this topic, we determined that square footage data would be skewed if applying this metric to schools. Most libraries do not have large auditoriums or gymnasiums. Schools have this type of open square footage that would cause an increase in square footage where wireless penetration will not require the same type of equipment as classrooms with concrete walls separating them. As a result, we did not pursue this format for determining the best means by which to assign budgets.

Since the West Virginia Department of Education is currently the only state consortia applicant filing Internal Connections on behalf of schools in the nation, we have access to data that most applicants and state consortia leads do not. As a result, we have put together estimates for the per-pupil budgets that the FCC can use as a real-life example, rather than an estimation based on anecdotal evidence.

[12] NPRM FCC-19-58A1, ¶ 28-29

The method used was selection of schools that were differently sized to represent all applicants. We selected a small floor school with 24 students and 20 classrooms (the School for the Deaf), a small school of 173 students and 15 classrooms, a medium school of 424 students and 40 classrooms and a large school of 1,881 students and 106 classrooms.

Within each school, we looked at what a **complete** project should require. This does not take into consideration caching or basic maintenance services and only looks at the costs for Internal Connections. We included quotes for wireless access points, controller, cabling drops and connector components, fiber backbones to connect network closets, switches and components, uninterruptible power supplies (UPS), enclosed cabinets, routers, licensing for all equipment and installation/configuration costs. We utilized one manufacturer and our two State Master Contract price lists and included the high and low cost of *each item* to show the range of pricing, since this will vary among applicants' states across the nation. This raw data is provided in Appendix A of this filing. Since we are currently facing an increase in costs due to Tariff rates and increasing inflation, I have also included per-pupil amounts with 25% Tariffs. Without Tariffs, the pricing ranged between$250-350 per pupil. When the Tariff rates and other cost increases due to inflation were added, it increased to $350-$400 per pupil. When averaging, the per-pupil, the floor school skewed the results, so we looked at the average based solely on the small, medium and large schools.

Application and Administration[13]

For further simplification, we propose that the FCC apply a standard five-year budget and discount calculation for E-rate. During the FCC E-rate Modernization Report and Order and Further Notice of Proposed Rulemaking,[14] the FCC inquired as to ways to make the application process more

[13] NPRM FCC-19-58A1, ¶ 30
[14] *See* Report and Order and Further Notice of Proposed Rulemaking. https://docs.fcc.gov/public/attachments/FCC-14-189A1.pdf

streamlined. This would also lend itself to streamlining the application process in general. Some flexibility must also be afforded to applicants in this realm. Due to the United States Department of Agriculture's (USDA) requirements for the Community Eligibility Provision (CEP), some applicants would be starting in a different base year than others. Those in Funding Year 2020, may not be starting with a new CEP cycle and thus will be required by the USDA to update within the five-year Category Two budget cycle.[15] Applicants need to have the option of, during any funding year administrative window, being able to update their enrollment and NSLP/CEP data. This is especially critical for applicants who are facing a change in poverty in their area. With this allowance, EPC's applicant profile for each school should show the year used for NSLP/CEP to identify when this information was locked in for each of ensuring that the correct data collection is reviewed during audit. This would also allow for applicants to adjust their enrollments if they have new school locations onboarding to the application. With the USDA's program, "If the composition of schools in the LEA changes, but the overall attendance area served by the LEA does not change, an ISP recalculation is not required."[16] As such, we should only recalculate when new schools are added that will impact the overall enrollment of the district. When applying a district discount, there is no waste of funding due to school mergers as the students are simply moving within the district.

We agree with the paragraph 29 proposal to codify rounding of the inflation calculation to two decimals for the Category 2 multipliers in Funding Year 2020.[17] This will simplify for the applicants and the state coordinators educating applicants when the message is conveyed, and the calculation of the budgets are determined.

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[15] Community Eligibility Provision (CEP) Planning & Implementation Guidance. "Mid-Cycle ISP Recalculations." Page 16. https://fns-prod.azureedge.net/sites/default/files/cn/SP61-2016-CEP_Guidance.pdf

[16] Community Eligibility Provision (CEP) Planning & Implementation Guidance. "LEAs Participating District-wide." Page 16. https://fns-prod.azureedge.net/sites/default/files/cn/SP61-2016-CEP_Guidance.pdf

[17] NPRM FCC-19-58A1, ¶ 29

The E-rate program only requires identification of equipment location via a Form 500 Equipment Transfer during the first three years after application. If applicants are required to maintain documentation of inventory throughout the ten years from installation, this alone should be sufficient. Thus, we request that the equipment transfer process utilized via the Form 500 be eliminated to further streamline the application process and reduce paperwork and PIA reviews required by the program. During audit, applicants will always be required to provide evidence of where the equipment is located, so inventory documentation is still required. This simply eliminates an additional step required by the program for applicants to maintain.

Regarding simplification of the application process when it comes to Master Contracts, it should be noted that when an applicant submits a Form 470, they are presently able to cite that they prefer a specific manufacturer, or equivalent. It is a rare occurrence that service providers offer other manufacturers as an option; however, when applicants utilize state master contracts, they are required to evaluate all manufacturers to establish cost-effectiveness. With every circumstance in our experience, the factors such as manufacturer experience, cost to retrain staff and especially the ability to manage the network when an existing manufacturer's platform is already in place in a district/school always impact the cost-effectiveness that results in the incumbent manufacturer being selected. As a result, we believe that as long as a master contract has been successfully bid, evaluated and awarded, applicants should be able to eliminate a mini-bid process among manufacturers to show which is most cost-effective and be permitted to focus on solely which service provider offers the lowest cost products from the manufacturer that the applicant uses as their platform in the school/district.

III. Transition to Permanent Extension of Category Two Budget Approach[18]

[18] NPRM FCC-19-58A1, ¶ 31-36

We strongly encourage the FCC to make applicable the permanent extension and reset of the Category 2 per-pupil budget approach effective in the 2020 funding year without any additional delay. This will keep the round number of the five-year budgets so that this upcoming cycle resets in 2025, rather than another sixth year, and avoidance of rolling funds from previous which, which could result in confusion. We also propose that this should continue throughout the anticipated next five-year cycle going forward, permanently. Applicants are now familiar with this five-year cycle and maintaining this is critical to simplification and ensuring applicants' understanding. This should be reset and no remaining funds should roll over. If we lock in the budget in year one, we also propose that the multiplier be locked in with inflation factors applied to cover the entire five years. For example:

How are the C2 budgets adjusted by inflation each funding year?

	Per Pupil Amount[19]	Increase Percentage from Previous Year	Increase Percentage from Base Year
2015	$ 150.000000000		
2016	$ 151.500000000	1.000%	1.000%
2017	$ 153.469500000	1.300%	2.313%
2018	$ 156.231951000	1.800%	4.155%
2019	$ 159.669053922	2.200%	6.446%

We propose the percentage of increase used in the last five years of budget be applied to the next five years for each budget cycle, looking back over inflation cycles. This will not only permit standardization and a stable budget amount over the cycle but will also streamline the application process since applicants will enter each funding year knowing what the budget will be and not having to wait until the inflation factor is released. Additionally, when the cycle resets, the applicants aren't awaiting some new factor, and the previous five years' factor can then be applied instead of waiting on

[19] USAC. *Category Two Budget. How are the C2 Budgets adjusted by inflation each funding year?* https://www.usac.org/sl/applicants/step03/category-two-budget.aspx

new numbers. These changes can all be realized without an extension of an additional funding year of budgets utilizing EPC as-is and the management of budgets done in the background via PIA using offline documentation of calculations.

Conclusion

Based on the experience of the West Virginia Department of Education in the Category 2 application process and feedback from applicants, we strongly encourage the FCC to adopt an Order that reflects the recommendations we have thoughtfully considered and set forth in our comments.

Respectfully Submitted,

/s/ Julia Benincosa Legg
State E-rate Coordinator
West Virginia Department of Education
1900 Kanawha Boulevard., East
Building 6, Room 750
Charleston, WV 25305-0330
(304) 558-7880
julia.legg@k12.wv.us

Attachment: Appendix A

Appendix A

High-Low Project Estimates

WV Department of Education

					2019 E-rate Budget (adjusted for inflation)		Actual Total Costs		Per Pupil Actually Required based on Actual Total Costs		Total Cost with Tariffs		***Per Pupil Required with Tariffs***		
	Enrollment	Scenario	School Name	Number of Classrooms	FY2019 Per Pupil Budget	2019 Per Pupil Amount	Low	High	Low	High	Low	High	Low	High	
	1881	Large School	Cabell Midland High	106	$ 300,337.49	$159.67	$ 427,301.91	$ 521,637.94	$ 227.17	$ 277.32	$ 534,127.39	$ 652,047.43	$ 346.65	$ 283.96	
	424	Medium School	Kingwood Elementary	40	$ 67,699.68	$159.67	$ 97,802.17	$ 113,002.69	$ 230.67	$ 266.52	$ 141,253.36	$ 122,252.71	$ 288.33	$ 333.14	
	173	Small School	Aurora Elementary	15	$ 27,622.75	$159.67	$ 51,652.20	$ 79,208.87	$ 298.57	$ 457.85	$ 64,565.25	$ 99,011.09	$ 373.21	$ 572.32	
	24	Floor School	WV School for the Blind	20	$ 9,793.04	$159.67	$ 57,978.82	$ 72,508.25	$ 2,415.78	$ 3,021.18	$ 72,473.53	$ 90,635.31	$ 3,019.73	$ 3,776.47	
Average including floor schools	625.5	Average		45.25	$ 101,363.24	$ 159.67	$ 158,683.78	$ 196,589.44	$ 793.05	$ 1,005.72	$ 203,104.88	$ 203,104.88	$ 1,006.98	$ 1,241.47	Average including floor schools
Average of non-floor schools	826	Average of non-floor schools		54	$ 131,886.64	$ 159.67	$ 192,252.09	$ 317,320.32	$ 252.13	$ 333.90	$ 246,648.67	$ 337,690.38	$ 336.06	$ 396.47	Average of non-floor schools
	Enrollment	Scenario	School Name	Number of Classrooms	FY2019 Per Pupil Budget	2019 Per Pupil Amount	Low	High	Low	High	Low	High	Low	High	
					2019 E-rate Budget (adjusted for inflation)		Actual Total Costs		Per Pupil Actually Required based on Actual Total Costs		Total Cost with Tariffs		***Per Pupil Required with Tariffs***		

Appendix A

High-Low Project Estimates
WV Department of Education

Large High School

106 classrooms; 1,881 students

Qty	Item	Low Cost	High Cost
135	4x4, Wave 2 APs	$ 50,070.15	$ 54,738.45
2	Clear AP cover	$ 92.00	$ 170.00
135	Installs	$ 10,125.00	$ 10,167.00
726	Cabling drops (APs only)	$ 123,420.00	$ 127,050.00
16	Patch Panels	$ 4,896.00	$ 4,896.00
726	Patch Cables	$ 3,267.00	$ 3,267.00
n/a	Conduit	$ 11,200.00	$ 11,868.00
n/a	J-Hooks & Install	$ 1,300.00	$ 1,770.00
106	Room penetration	$ 3,180.00	$ 3,180.00
n/a	Fiber backbone	$ 23,585.00	$ 29,575.00
n/a	Fiber patch cables	$ 720.00	$ 744.00
25	Switches-48 port	$ 88,435.00	$ 96,483.25
6	Switches-24 port	$ 12,323.10	$ 13,716.54
25	Switch licensing--48 port (5 yr)	$ 16,015.25	$ 27,832.00
6	Switch licensing--24 port (5 yr)	$ 1,819.02	$ 2,132.88
15	Modules-10gig	$ 23,271.24	$ 57,935.19
10	Modules-1gig	$ 6,480.25	$ 27,838.46
	Stacking cables	$ 182.31	$ 851.69
27	Switch installs	$ 2,295.00	$ 2,295.00
1	UPS-2200	$ 832.42	$ 844.26
1	UPS-1500	$ 545.01	$ 551.69
1	UPS-750	$ 324.41	$ 329.03
3	UPS Install	$ 150.00	$ 425.00
11	Cabinet-7' Freestanding Floor Mount Enclosure	$ 20,889.00	$ 20,900.00
11	Cabinet Install	$ 4,675.00	$ 4,675.00
1	Controller	$ 9,213.75	$ 9,257.50
1	Install WLAN Controller	$ 400.00	$ 500.00
135	Controller licensing	$ 7,406.00	$ 7,455.00
1	Layer 3 routing switch	included in switches	included in switches
1	Routing Configuration	$ 190.00	$ 190.00
		$ 427,301.91	$ 521,637.94

Appendix A

High-Low Project Estimates
WV Department of Education

Medium School

40 classrooms; 424 students

Qty	Item	Low Cost	High Cost
38	3x3, Wave 2 APs	$ 6,965.02	$ 7,011.38
38	Installs	$ 2,964.00	$ 3,040.00
1	Clear AP cover	$ 46.00	$ 85.00
112	Cabling drops	$ 19,040.00	$ 21,840.00
3	Patch Panels	$ 918.00	$ 918.00
112	Patch Cables	$ 504.00	$ 504.00
n/a	Conduit	$ 975.00	$ 975.00
n/a	J-Hooks & Install	$ 700.00	$ 700.00
40	Room penetration	$ 1,200.00	$ 1,200.00
n/a	Fiber backbone	$ 2,154.00	$ 2,206.00
2	Fiber patch cables	$ 48.00	$ 48.00
9	Switches-48 port	$ 31,836.60	$ 34,733.97
1	Switches-24 port	$ 2,053.85	$ 2,286.09
9	Switch licensing--48 port (5 yr)	$ 5,765.49	$ 10,019.52
1	Switch licensing--24 port (5 yr)	$ 303.17	$ 355.48
4	Modules-10gig	$ 6,469.09	$ 6,515.15
4	Stacking cables	$ 370.30	$ 370.30
10	Switch installs	$ 1,000.00	$ 1,000.00
2	UPS-1500	$ 1,090.02	$ 1,103.38
2	UPS-1000	$ 807.42	$ 818.92
4	UPS Install	$ 150.00	$ 450.00
3	Cabinet-7' Freestanding Floor Mount Enclosure	$ 5,697.00	$ 5,700.00
3	Cabinet Install	$ 1,275.00	$ 1,275.00
1	Controller	$ 4,780.21	$ 9,257.50
1	Install WLAN Controller	$ 500.00	$ 400.00
38	Controller licensing		Controller comes with 50 licenses
1	Layer 3 routing switch	Included in switches	Included in switches
1	Routing Configuration	$ 190.00	$ 190.00
		$ 97,802.17	$ 113,002.69

Appendix A

High-Low Project Estimates
WV Department of Education

Small School

15 classrooms; 173 students

Qty	Item	Low Cost	High Cost
18	3x3, Wave 2 APs	$ 3,299.22	$ 6,600.78
18	Installs	$ 1,440.00	$ 1,440.00
1	Clear AP cover	$ 46.00	$ 85.00
84	Cabling drops	$ 15,960.00	$ 16,380.00
2	Patch Panels	$ 612.00	$ 612.00
168	Patch Cables	$ 756.00	$ 756.00
n/a	Conduit	$ 573.30	$ 675.00
n/a	J-Hooks & Install	$ 160.00	$ 206.00
15	Room penetration	$ 450.00	$ 450.00
n/a	Fiber backbone	$ 1,556.00	$ 1,634.00
4	Fiber patch cables	$ 96.00	$ 96.00
4	Switches-48 port	$ 15,437.32	$ 29,167.08
1	Switches-24 port	$ 2,243.96	$ 2,286.09
4	Switch licensing--48 port (5 yr)	$ 2,562.44	$ 4,453.12
1	Switch licensing--24 port (5 yr)	$ 303.17	$ 355.48
8	Modules-1gig	$ 2,058.38	$ 2,510.60
4	Stacking cables	$ 147.44	$ 185.15
5	Switch installs	$ 340.00	$ 600.00
1	UPS-1500	$ 545.01	$ 551.69
1	UPS-1000	$ 403.71	$ 409.46
2	UPS Install	$ 75.00	$ 225.00
1	Cabinet-7' Freestanding Floor Mount Enclosure	$ 1,899.00	$ 1,900.00
1	Cabinet Install	$ 425.00	$ 425.00
1	Controller	**None required based on quote.	$ 6,515.42
1	Install WLAN Controller	$ 73.25	$ 500.00
1	Layer 3 routing switch	Included in switches	Included in switches
1	Routing Configuration	$ 190.00	$ 190.00
		$ 51,652.20	$ 79,208.87

Appendix A

High-Low Project Estimates
WV Department of Education

Floor School (School for the Deaf)

20 Classrooms; 24 Students

Qty	Item	Low Cost	High Cost
23	3x3, Wave 2 APs	$ 4,215.67	$ 8,434.33
23	Installs	$ 1,840.00	$ 1,840.00
1	Clear AP cover	$ 46.00	$ 85.00
72	Cabling drops	$ 13,680.00	$ 14,040.00
3	Patch Panels	$ 918.00	$ 918.00
144	Patch Cables	$ 648.00	$ 648.00
n/a	Conduit	$ 573.30	$ 675.00
n/a	J-Hooks & Install	$ 160.00	$ 206.00
20	Room penetration	$ 600.00	$ 600.00
n/a	Fiber backbone	$ 1,556.00	$ 1,634.00
4	Fiber patch cables	$ 96.00	$ 96.00
4	Switches-48 port	$ 15,437.32	$ 29,167.08
1	Switches-24 port	$ 2,243.96	$ 2,286.09
4	Switch licensing--48 port (5 yr)	$ 2,562.44	$ 4,453.12
1	Switch licensing--24 port (5 yr)	$ 303.17	$ 355.48
8	Modules-1gig	$ 2,058.38	$ 2,510.60
4	Stacking cables	$ 147.44	$ 185.15
5	Switch installs	$ 340.00	$ 600.00
1	UPS-1500	$ 545.01	$ 551.69
1	UPS-1000	$ 403.71	$ 409.46
2	UPS Install	$ 75.00	$ 225.00
1	Cabinet-7' Freestanding Floor Mount Enclosure	$ 1,899.00	$ 1,900.00
1	Cabinet Install	$ 425.00	$ 425.00
1	Controller	$ 6,515.42	Controllerless APs quoted. Not Required.
1	Install WLAN Controller	$ 500.00	$ 73.25
1	Layer 3 routing switch	Included in switches	Included in switches
1	Routing Configuration	$ 190.00	$ 190.00
		$ 57,978.82	$ 72,508.25